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1 Introduction

Contemporary sociophonetic research has identified two major vowel shifts in progress in North American English, characterized as the Northern Cities Shift (NCS) and the Southern Vowel Shift (SVS). The Northern Cities Shift originated in major urban centers in the Inland North and the stages in its advancement and diffusion in real time are well-documented. Further, a considerable body of evidence suggests that the NCS is dynamic and advancing. Differing radically from the distribution of the NCS, the Southern Vowel Shift is most advanced in rural areas of the Appalachian regions of the upland south, which appears to be the “originating center of the widespread Southern Shift, which has expanded to influence all but the marginal coastal areas of the South” (Labov, Ash, and Boberg 2006:263). Additionally, some evidence suggests that the SVS is slowly receding in apparent time, particularly the later stages of the Shift involving the reversal of the high front vowels (Labov, Ash, and Boberg 2006:257). Unfortunately, much of the work in understanding this pattern of change focuses on urban speech and as a result, the timing of the stages in the advancement of the SVS is not easily determined or well understood.

In an effort to generate more data to provide a better understanding of the development and diffusion of the SVS in real time, the present study examines the progress of the Southern Vowel Shift in the speech of rural areas of the Cumberland Plateau region of the Appalachian Mountains of south-eastern Kentucky. Using samples of real time speech across three generations, the study clarifies the time depth of the stages in the SVS. Contrary to the findings presented in ANAE, preliminary results of this examination reveal that the latter stages of the SVS involving the reversal of the relative positions of the front vowels are in fact solidifying and expanding in rural areas of Appalachia. More detailed instrumental analysis also shows that the progression of the stages of the SVS must be placed within the context of the upgliding and breaking forms of front vowels characteristic of the so-called “drawl” of Southern speech. In this respect, a case will be made that breaking is part of the triggering mechanism of the SVS.

As it is currently understood, the Southern Shift occurs in roughly three stages. Labov, Ash, and Boberg argue that in the triggering stage of the Southern Shift, the monophthongization of /ay/ effectively removes /ay/

from the subsystem of front upgliding vowels, accompanied by a fronting or backing of the long nucleus. In stage 2, the nucleus of /ey/ centralizes and lowers, moving into the phonological space that was occupied by /ay/ prior to glide deletion. The short /e/ consequently fronts and raises into the space that was occupied by /ey/, developing a front upglide in the process. Stage 3 of the Southern Shift is the consequent and parallel lowering of /iy/ and fronting and raising of /i/. The end result is a relative reversal of the front/back locations of /ey/ and /e/, /iy/ and /i/. As stages 2 and 3 of the shift proceed, there are four possible relations between the long and short vowels, respectively, which can be described as quadrants in the space of the vowel envelope. In the most conservative situation, Quadrant 1, /e/ is lower and back of /ey/. In Quadrant 2, /e/ is front of /ey/ but still lower. Quadrant 3 is the converse of Quadrant 2—/e/ is higher but still back of /ey/. The full development is Quadrant 4 in which /e/ is fully reversed in relation to /ey/, both fronter and higher. The possible relations between the two high front vowels in Stage 3 are similar to stage 2, resulting in an analogous change in the position of the high vowels. Labov et al. find that the distribution of this stage is much more restricted than stage 2, defining an area they term the Inland South, and only 11 speakers from their sample show the relative reversal of the high front vowels.

The study reported here examines the variety of English spoken in the Cumberland Plateau region of the Eastern Coalfield region of Kentucky. The central focus is on the front vowel subsystem. Although some of the observations will advance tentative hypotheses or explanations for change, the majority of the observations will be descriptive. The goals are to determine whether the vowel changes identified as the Southern Vowel Shift are confirmed by the data, how advanced the changes are in terms of stages 2 and 3, when and which changes occurred first, whether the changes are receding or advancing, and, finally, to identify linguistic factors that may be causing these changes.

2 Background

The Eastern Coalfield region of Kentucky is part of Appalachia, a diverse and complex region that is a cultural and geographical borderland that constituted America's first and longest-lived frontier, shaping westward movement in a way unlike any other area of the country. The Eastern Coal Field was the last region of Kentucky to be settled. Stretching across the Cumberland Plateau region of the Appalachian Mountain range, the Eastern Coal Field has very little open land, which has hindered settlement, economic development, and the construction of adequate transportation facilities to

make the region accessible. The region overall has a low population density, which has declined from about 25% of the total population of the state in 1990 to about 17% of the total population in 2000, a product of a declining birth rate and domestic net migration. The region has exceedingly high rates of poverty and unemployment. Outside of the Ashland-Huntington area, nearly 40% of the residents of the region live below the national poverty level, reflected in the highest concentration of poorest counties in the U.S. Aside from subsistence agriculture and small-scale burley tobacco production, the economy is largely based on the extraction of natural resources. Kentucky is historically the top coal producer in the United States. About 75 percent of all Kentucky coal comes from the Eastern Coal Field, and the economy of eastern Kentucky tends to revolve around coal mining and hardwood timber. The Eastern Coal Field was once a hardwood forest with great stands of oak, hickory, ash, walnut, cherry, and poplar. The trees were cut in the early part of the twentieth century, and most of the large forested areas today are at least second growth. There are numerous sawmills in eastern Kentucky but most are small operations with few employees. These economic facts, combined with the high number of citizens receiving public assistance—"on the dole"—prompted one prominent local official to label the region a "kept colony."

3 Method

The data used for this study are drawn from interviews conducted in nine counties on the Cumberland Plateau area of the region extending from Pine Mountain, north of the Cumberland Gap, to the Pottsville escarpment, which separates the Eastern Coal Field from the Mississippian Plateau of south-central and western Kentucky. The location of these communities is indicated in Figure 1 with further detail provided in Table 1. The results presented are based on the analysis of front vowel systems in the speech of 30 subjects across three generations, born between 1884 and 1985.

Acoustic analysis of back vowel tokens was performed using PRAAT 4.21, developed by Paul Boersma and David Weenik. The single point of F1/F2 value measurement methodology that informs the Telsur project was determined to be insufficient for purposes of the current project, as critical information about the distinctive character of a vowel phoneme is frequently observed in its trajectory, not its nucleus, particularly in those varieties of American English identified as Southern (Thomas 2003). To capture information about the trajectory of each vowel token, multiple F1–F3 measurements were taken from FFT spectra of each vowel, using a 25 ms. Gaussian

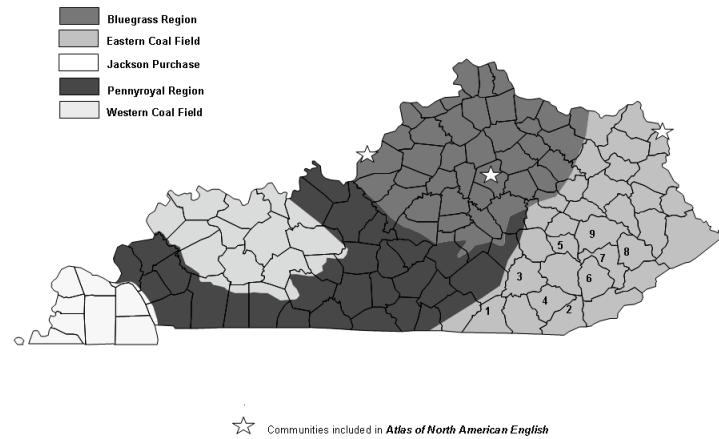


Figure 1: Community locations

Key	County	Community	2000 Population	Population trend
1.	McCreary	Stearns	1586	stable
		Whitley City	1111	decline
2.	Bell	Pineville	2093	decline
3.	Laurel	East Berndstadt	774	stable
		London	5692	growth
4.	Knox	Walker		rural village
5.	Owsley	Booneville	111	decline
		Ricetown		rural village
6.	Leslie	Peadiss		rural village
		Stinnett		rural village
7.	Perry	Viper		rural village
8.	Knott	Emmalena		rural village
		Topmost		rural village
9.	Breathitt	Hardshell		rural village

Table 1: Location, population, and population trend of communities. Data are from the Kentucky State Data Center at the University of Louisville.

window, at between 10 to 12 ms. intervals, from approximately 25 ms. after vowel onset and approximately 25 ms. from the transition at the end of the vowel into the following consonant. The difficulties in plotting sequential measurements of a single vowel are overcome by using multiple plots for each speaker, comparing onset, midpoint, and offset. Extraction was performed using the linear predictive coding method, with pole settings ranging from 8 to 14. Automation of data collection was facilitated by the use of Akustyk 1.74, a plug-in for PRAAT developed by Bartek Plichta. In many cases, this analysis was confirmed by visual inspection of the FFT spectra and by hand measurements.

4 Findings and Discussion

This section overviews the systems of speakers across several generations, to examine the changes in front vowel configuration which can be observed over time, follows with an analysis of the mean values for all speakers of the relative positions /e/~ey/ and /i/~iy/ in terms of the four quadrants outlined above, to determine whether the shift is advancing or receding in this region, and finally concludes with some tentative evidence that the Appalachian drawl may play a role as a triggering mechanism in the reversal.

4.1 Systems of Individual Speakers across Four Generations

This section contains plots for the vowel systems for a range of speakers covered by the study across a range of generations. Comparison of these plots makes it possible to see the progression of the stages of the Southern Vowel Shift over the past century. Although the focus of the discussion is on the non-low front vowel subsystem, in most cases the complete vowel system is represented, except in cases in which the nucleus of the back-upgliding diphthong /aw/ overlaps with other front vowels.

The oldest speaker analyzed for this study is a male farmer from Laurel County born in 1883. As evident in Figure 2, the nucleus of /ay/ has moved back and stage 2 of the Southern Shift is beginning, with /e/ slightly higher and front of /ey/. The high front vowels show no relative change. Note also the fronting of the back vowel /uw/.

It is in the next generation of speakers that stage 3 of the Southern Shift begins to appear. As indicated in Figure 3 below, stage 2 has fully advanced in the vowel system of a housewife from Breathitt County born in 1935, as the nucleus of /e/ is further back and lower than the nucleus of /ae/. The beginning of the development of stage 3 is also apparent in the system of this speaker, evident in the relative reversal of the high front vowels, with /i/

slightly higher and front of /iy/. Note that the nuclei of the low back vowels /o/ and /oh/ overlap. In this case, however, the overlap is not an indication of low back vowel merger but is characteristic of the back upglide shift in the speech of the southern highlands. A similar pattern of development is apparent in the system of a female teacher from Knott County born in 1953, as shown in Figure 4.

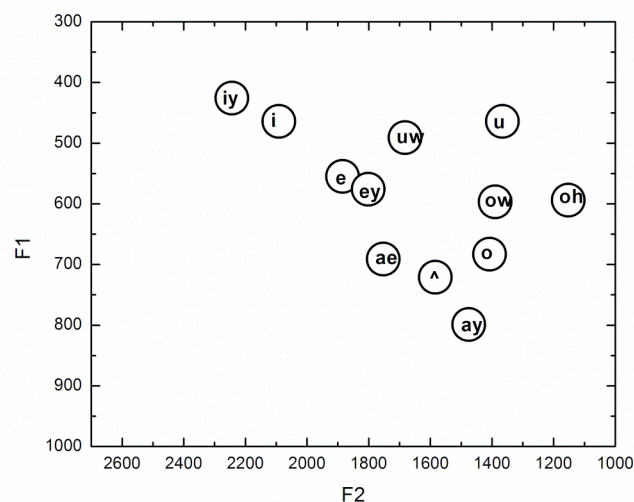


Figure 2: White male, born 1883, Laurel County, farmer

It is in the systems of the youngest generation of subjects in the study that stage 3 is most fully advanced. As indicated in Figure 5, stage 3 is more fully advanced in the speech of a young male born in Breathitt County in 1979.

Finally, in the vowel system of one of the youngest speakers in the study, a female teacher from Bell County born in 1981, not only are both stages 2 and 3 of the shift present but the distance between /i/ and /iy/ is also increasing.

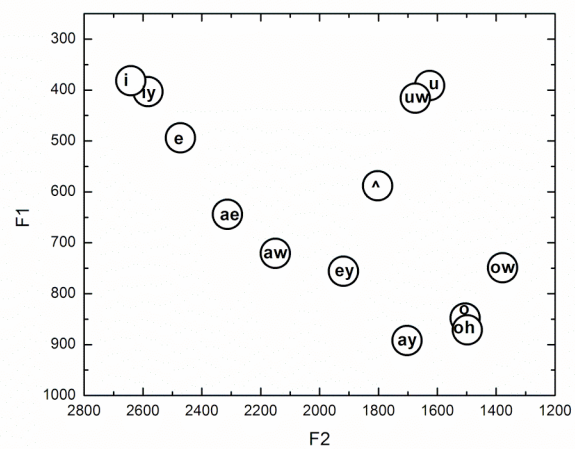


Figure 3: White female, born 1935, Breathitt County, housewife

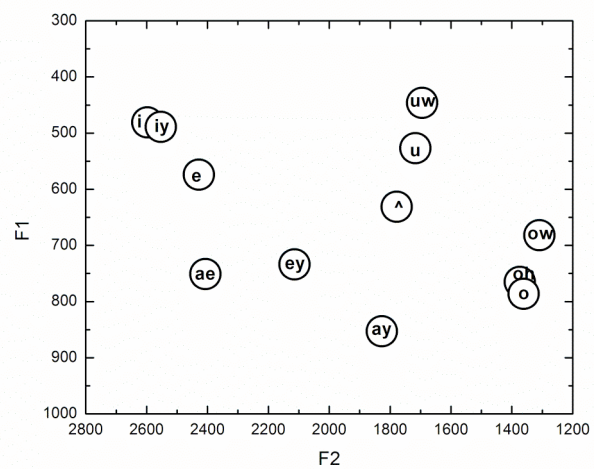


Figure 4: White female, born 1953, Knott Count, teacher

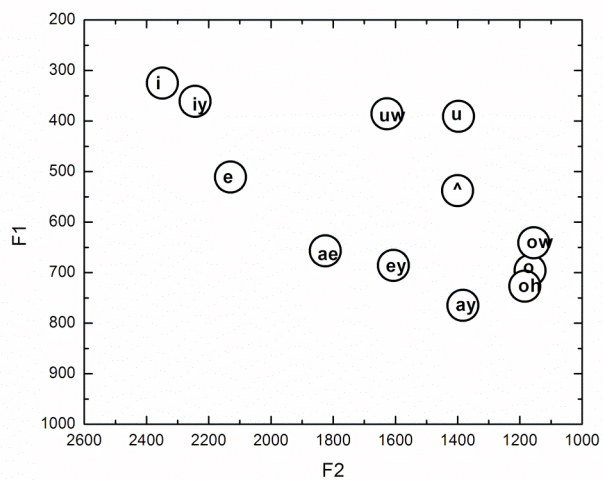


Figure 5: White male, born 1979, Breathitt County, disabled

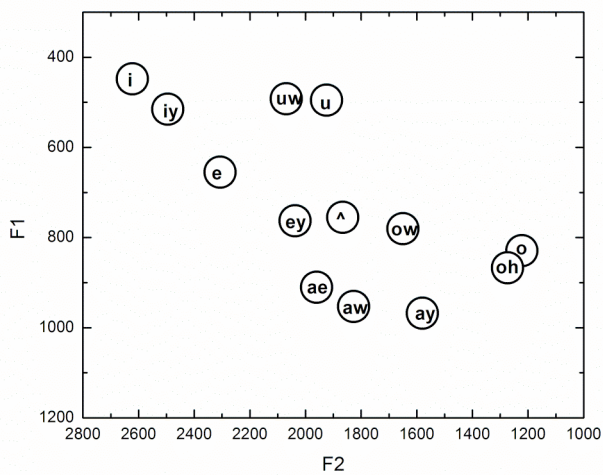


Figure 6: White female, born 1981, Bell County, teacher

4.2 Mean Values of the Relative Positions of Front Vowels in Stages 2 and 3 of the Southern Shift

Beyond the systems of individual speakers, a fuller picture of the development of the stages of the Southern Shift emerges from an examination of the relative positions of the front vowels in all 30 subjects included in the study. Figure 7 shows a comparison of the mean values for the mid front vowels for all subjects of varying ages, using the differences between the F1 and F2 values for /ey/ and /e/ as values on the axes. The plot is divided into four quadrants, mirroring the possible relative positions outlined above. It is almost universally the case that all speakers analyzed for this research show full stage 2 reversal of the mid front vowels.

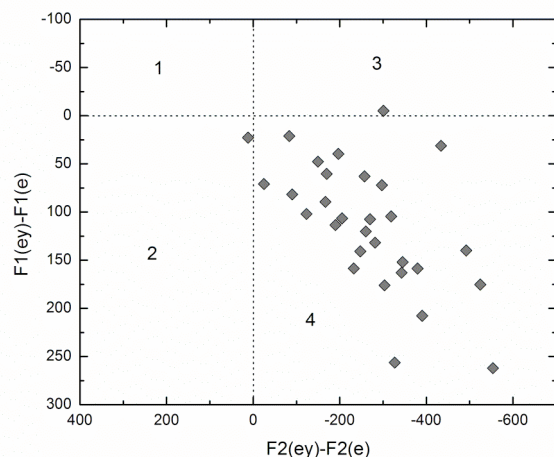


Figure 7: Comparison of means for /ey/ and /e/

Figure 8 shows a comparison of the mean values for the high front vowels for subjects of all ages, again, using the differences between the F1 and F2 values of /iy/ and /i/ as values on the axes. Likewise, the plot is divided into four quadrants, mirroring the possible relative positions outlined above. In contrast with stage 2, there is a complete range of the possible relative positions of the high front vowels.

The progression of stage 3 can be seen more clearly in real time when the subjects for the study are sorted into three age groups, those born before 1930 (pre-Depression era), those born between 1930 and 1970, and those

born after 1970 (post-Vietnam era). Such a picture is painted in Figure 9, which shows a comparison of the means values for the high front vowels by generation of speaker.

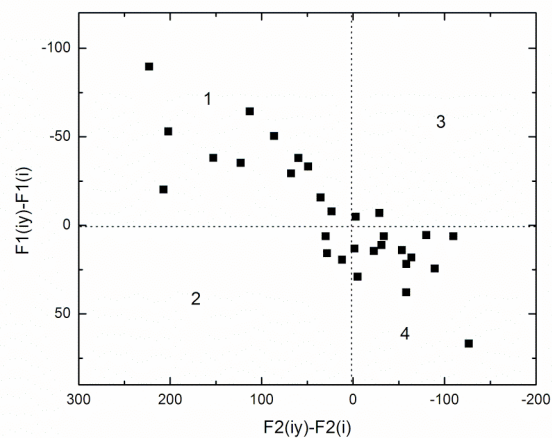


Figure 8: Comparison of means for /iy/ and /i/

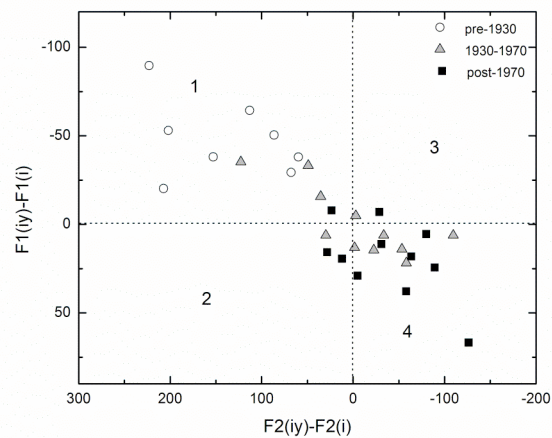


Figure 9: Comparison of means for /iy/ and /i/ by generation

Here a more interesting pattern emerges. None of the speakers born in the pre-Depression era display stage 3 of the shift, with stage 3 emerging in the speech of speakers born after 1930. Stage three is most advanced in the speech the youngest generation of speakers, those born in the post-Vietnam era.

Even though there is some variation among the younger speakers, which may be a function of differing constructions of identity (local versus global), it is clear that the advanced stages of the shift are not limited to the middle generation but are in fact advancing in real time in the speech of the younger generation. In this respect, these results provide support for the notion that the SVS is an active ongoing change in the rural areas of the Highland South. Further, given that the Southern Shift is receding in apparent time in urban areas, these results strongly support the notion that the Southern Shift began as a rural innovation, which most likely spread to urban areas from rural areas in a pattern of counterhierarchical diffusion. This diffusion most likely occurred as a function of rural out-migration to urban centers and successively receded in urban areas, as younger urban speakers rejected a rural identity in favor of an urban identity.

4.3 Observations on Linguistic Mechanisms Underlying the Southern Shift

The remaining question to be considered is, what are the linguistic factors that motivate or underlie stages 2 and 3 of the Southern Shift, beyond the ungliding of /ay/. Although an important element of the front vowel reversal is clearly the laxing and falling of the nuclei of the traditional long diphthongs /ey/ and /iy/, consideration must be given to the postulate that the phenomenon of the Appalachian drawl also plays a central role in the front vowel reversal.

In the Appalachian drawl, the short front vowels lengthen and break, developing off-glides. In many cases, these vowels are not simply diphthongized but triphthongized. Although there are a variety of combinations and considerable individual variation, each lengthened short vowel has a potential for three morae, respectively (m_0), the vowel nucleus, (m_1), a high front glide, when present, and (m_2), a central offglide. Close examination of wave forms and spectrograms shows this pattern.

Figure 10 shows the wave form and spectrogram for a triphthongal pronunciation of "bit." Note that the wave form shows two pulses of energy with an energy drop between the two. These three sections of the vowel envelope correspond with the three morae of the vowel. The nucleus corresponds with the initial energy pulse. The front upglide in which the tongue

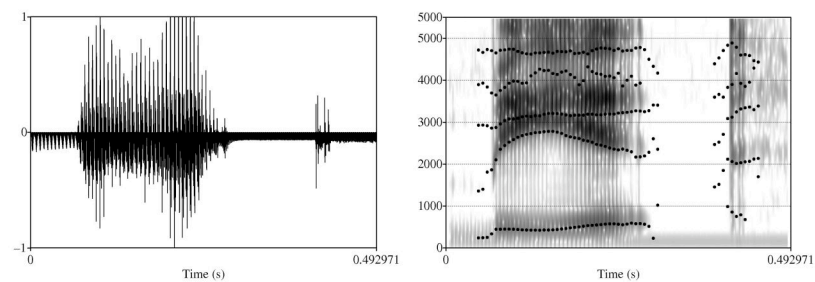


Figure 10: Waveform and spectrogram for Appalachian “bit”

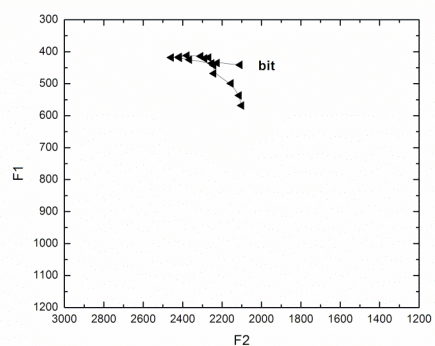


Figure 11: Formant trajectory plot for triphthongal “bit”

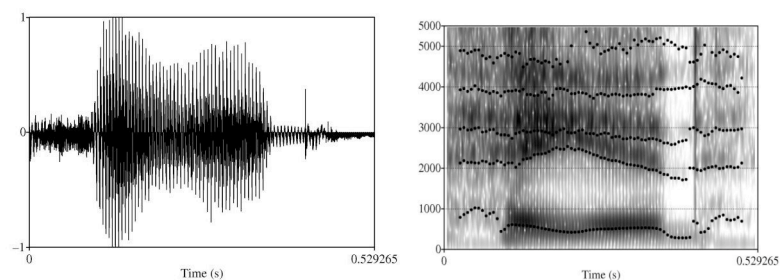


Figure 12: Waveform and spectrogram for Appalachian “head”

moves to a higher fronter position corresponds with the amplitude drop. The final centralized offglide, in which the tongue returns to a position similar to the initial position of articulation, corresponds with the second energy pulse.

A plot of the formant trajectory is presented in Figure 11, illustrating the articulatory gestures described above. Figures 12 and 13 illustrate the same pattern for a triphthongal pronunciation of “head.”

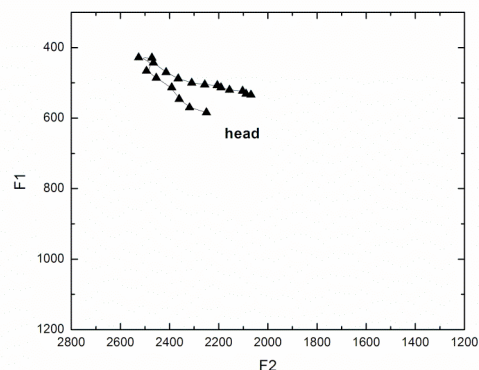


Figure 13: Formant trajectory for triphthongal “head”

These phenomena provide evidence for a pull chain explanation for stages 2 and 3 of the Southern Shift, first suggested by Feagin (1986). Basically, the concept is that the onset of the drawled short front vowel is pulled forward and up by the front upglide that correlates with the amplitude drop in the mid-section of the vowel. At present, there simply is not enough time data to prove that this articulatory movement initiated the change, but it clearly plays a role in its progress. It is interesting to note, however, that the older speakers, whose speech is not fully advanced with respect to stage 3 of the shift, are the most conservative with respect to the drawl and that the younger speakers, in whose speech the shift is most advanced in relation to stage 3 of the shift, show a more pronounced drawl.

An interesting effect of the stage 2 movement of /ey/ is that its nucleus overlaps with the nucleus of /ae/ in the systems of many younger Appalachians. This overlap of nuclei is illustrated in Figure 14, which displays the trajectories for “bait” and “bat.” As the graph illustrates, the two sounds differentiate themselves in terms of the complete path of the vowel trajectory. The lowered long front /ey/ has a strong front inglide, whereas the low front /ae/ shows the pattern of lengthening and breaking typical of the Appalachian drawl.

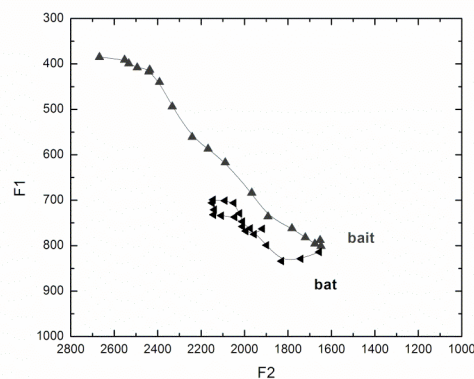


Figure 14: Formant trajectories for Appalachian “bait” and “bat”

Based on this analysis, this report concludes with the observation that this phenomenon lends support to Majors’ (2005) argument that sociophonetic research must consider more fully the role that the dynamic nature of the spectral shape of a vowel plays in the initiation of sound change and reinforces Thomas’ (2003) notion that we need better notational devices to capture the “rich phonetic patterning” lost by traditional abstract phonological representations.

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